

4) Discuss the relationship between social networks (Web and Internet) and sustainability. Include problems and solutions.

In order for sustainability to work successfully, all three pillars; environment, economy, and society all need to work together. All three components are equally important. The higher the environmental capacity, the higher the economic output, which leaves society with an abundant and prosperous life. The two obvious pillars are economy and environment, but how exactly does society fit in? Society needs to play an active role in maintaining and protecting the environment, thus, creating a never-ending cycle among the three pillars.

Social media has made connections, locally and globally, farther, faster, and of greater volume than any correspondence platform before it. Among the circling trending topics on the web is sustainability. Sustainability means different things to different people. Social media allows users, businesses, and organizations to connect and share ideas and opinions as well as inform those who have had little exposure to the concepts of sustainability before. The way many social sites are set up allow one to scroll through and interact with posts by other people. With this organization, one can easily stumble upon almost anything. With a flashy title, a trending hash tag, or an eye catching photo, any post can spread far and wide.

Ford is one of the many companies that has used social media to promote its sustainable products. To prove to U.S. drivers that fuel economy is as important as vehicle performance in an automobile, Ford teamed up with YouTube adventure sports star, Devin Super Tramp, and demonstrated all you can do with a Ford Focus on just one tank of gas. It is a subtle message, one that most of us were already aware of, but with over 1.4 million views, the video along with the promotional hash tag, #onetankadventure, has reached many people. The description of the video says, "we are still looking for awesome ideas of what to do for the rest of our Ford adventures. Upload to Instagram your idea/ adventure of what you would do with one tank of gas, and hopefully I can use your idea for one of our next videos." This comment engages the viewers and allows them to get excited and involved in the adventure.

According to TheGuardian.com, "if companies are going to become truly sustainable, they will need not just to change their systems, supplies, and products; they will also need to change the expectations and behavior of their consumers".

AT&T also used the web to promote the "It Can Wait Campaign". This movement aimed to reach the social aspect through caring for its stakeholders by advocating safe driving. The campaign was powerful from the beginning as it was driven by chairman and CEO, Randall Stephenson, however, it sealed the deal when it touched everyone's heart when families who have suffered from texting and driving accidents shared their personal stories. Both Ford and AT&T were successful in their approaches because they reached deep emotions of their consumers causing stronger reactions.

On a smaller scale, Pinterest is a site that provides ways to save money and time with things such as do-it-yourself projects, or “life hacks”. This website gives people the knowledge of ways to reuse and recycle objects and materials they already have. Examples might include ways of fixing up old furniture in order to allow it to still be used rather than thrown out. Other crafts include using easy to find materials in order to create desirable objects, such as learning how to use an old tire and rope to create a coffee table. In addition to imploring its viewers to reuse and recycle materials it is also a means of spreading ideas of sustainability quickly and easily. Additionally, Pinterest is a catalyst for spreading ideas. Because of its layout, people are able to be influenced by hundreds of ideas within minutes.

One of the problems with social media is that anyone can share anything regardless of accuracy and there is no way to tell what the true facts are. While this problem is difficult to solve as it potentially violates the freedom of speech, one way to solve this problem is by fighting fire with fire. While social media can allow for the spread of false information and potential greenwashing –it can also act as a catalyst in spreading articles which prove these inaccurate views wrong. Social media can work in both ways but in doing so it raises controversy. This controversy is what excites people to do more self-learning in order to truly get involved and interested in sustainability.

7) Explain five (5) actions that you think the average citizens can/should take to advance sustainability. Include concrete examples to illustrate your ideas.

Because of the increase in interest of sustainability, there is a lack of knowledge in the actions which a common person can take in order to make a difference in advancing sustainability. Five key actions include: driving less, eating organic foods, drinking tap water, picking energy efficient lighting options, and not relying on air conditioning and mechanical systems for comfort.

One of the most obvious solutions to help further sustainability is to drive less. Our current fossil-fuel based economy has led to a growing concentration of greenhouse gases in the atmosphere that is creating more extreme weather events, more severe and frequent cycles of drought and flood, and rising sea levels. If everyone drove less, pollution as well as the consumption of fossil fuels would all decrease. Instead of driving, average citizens have multiple options of more sustainable means of transportation such as public transportation, carpooling, walking, biking, rollerblading and much more. One ironic action many people practice is driving to a workout. Instead of driving, one could run or bike to their workout instead. Not only does this increase sustainability but people would become much healthier.

Another way to advance sustainability is by eating organic food rather than processed food. Eating sustainably-grown, unprocessed (or minimally processed) food, such as whole grains, legumes, and fresh fruits and vegetables, has a number of health benefits. One main one is an increased intake of important nutrients and minerals. Commercial animal feed often contains many unsavory –and potentially harmful –substances, including metal compounds, dangerous pathogens (e.g., salmonella), known carcinogens (e.g., dioxins and PCBs), plastics, rendered animal products, and animal waste, which may contain antibiotics and hormones. Not only is the living standards of animals important to their

health, but it is also important to ours as many poorly kept animals are catalysts for disease spread and callbacks in food.

If average citizens stop buying bottled water, then sustainability would be advanced immensely. Bottled water tends to be an environmental boondoggle. Not only are most bottled water brands using the same municipal water that is readily available from the tap, with a huge markup added to it, but those plastic bottles contribute to our massive plastic waste problem, even if in theory, they are recyclable. Bottled water produces up to 1.5 million tons of plastic waste per year. According to Food and Water Watch, that plastic requires up to 47 million gallons of oil per year to produce. And while the plastic used to bottle beverages is of high quality and in demand by recyclers, over 80 percent of plastic bottles are simply thrown away. That assumes empty bottles actually make it to a garbage can. Plastic waste is now at such a volume that large islands float endlessly in the world's major oceans. This represents a great risk to marine life, killing birds and fish which mistake our garbage for food. Thanks to its slow decay rate, the vast majority of all plastics ever produced still exist — somewhere.

Another way to advance sustainability is to use Energy Star qualified light bulbs. Lighting composes about 20 percent of the average home's electric bill. Energy Star qualified compact fluorescent lamps (CFLs) use up to 75 percent less electricity than incandescent light bulbs, last up to 10 times longer, cost little up front, and provide a quick return on investment. If every American home replaced their light bulbs with some form of energy efficient lighting, large shifts in sustainability would be achieved. Additionally, changing these bulbs removes large amounts of greenhouse gas pollution as well as less mercury in our environment. Every building uses some form of mechanical lighting and if this strategy was at least as sustainable as possible that would be a huge improvement.

A fifth way to advance sustainability is to open windows throughout the summer. Air conditioners can use up to 1/6th of U.S. electricity and, on hot summer days, consume 43% of the U.S. peak power load. According to the US Department of Energy, heating and cooling systems emit over a half billion tons of carbon dioxide into the atmosphere each year, adding to global warming. By opening windows in the summer, the amount of energy used for an HVAC system is decreased and thus the fossil fuel consumption is also decreased. Average citizens can use natural ventilation to cool their houses. Successful natural ventilation is determined by having high thermal comfort and adequate fresh air for the ventilated spaces, while having little or no energy used for active HVAC cooling and ventilation.

By implementing these five actions, average citizens can easily advance sustainability. Many people believe they are miniscule in the overall society's environmental impact, but if everyone practiced sustainability at some level, that alone would create a large improvement.

8) Explain actions that you think the US government should take to advance sustainability. Include concrete examples to illustrate your ideas.

Politics in the United States generally has a hard time making any serious changes in the way its citizens live their lives. Due to the desire to be re-elected, candidates will say and do whatever they can in order to gain the trust of the people — whether this is for or against sustainability. Additionally, after they enter office, not many radical interventions are completed at the fear of losing any potential votes.

This is detrimental not only to our country but to our world as there are many actions that could be taken in order to advance sustainability such as: a system of reward, a system of punishment, increased research, more environmental protection, and increased spread of information.

One thing that the government could be doing in order to advance sustainability is to provide incentives to corporations to phase out the use of fossil fuels. Currently, there are many acts created by the EPA which attempt to enforce sustainability such as the Clean Air Act and the Clean Water Act. Unfortunately, the EPA has a difficult time regulating companies as there are many rights which come in conflict with these acts. This is why many of the problems which correlate with the EPA's acts are often found in court as torts. Because it is still cheaper to use fossil fuels with no monetary benefit, corporations will either minimally follow these laws as well as find loop holes. Should incentives, such as tax breaks or other monetary rewards be implemented, corporations would see the option of phasing out fossil fuels as one of greater value than continuing otherwise. Another incentive which could work in addition to the positive reward system is a system of taxes on the amount of carbon emissions. If corporations were forced to pay for the amount of carbon they were emitting into the air rather than simply being an externality to business, then this would incentivize them to make the change not only out of the interest in not paying additionally for fossil fuels and their pollutants, but for the potential for award in their decrease attempts. This tax would not only help to decrease pollution but it would help to accelerate technology, grow new industries, and help to pay down the deficit.

In addition to investing money into the attempts to decrease the use of nonrenewable resources, federal money should also be invested into new energy sources. One "quick fix" option is Nuclear power. While it is hardly a perfect fuel to rely on, it is a much cleaner type of energy in comparison to fossil fuels. Peter Rave, president emeritus of the Missouri Botanical Garden states, "Nuclear is the only short- to medium-term way to really get away from fossil fuels. Any potential damage which would be produced through the faults in the nuclear system, such as disposal, are still much less destructive than the damage done by relentless global warming.

Another means of advancing sustainability which can be performed by our government is taking extra actions in order to protect it. While land is a difficult to protect, oceans still have the opportunity to be protected by the government, similar to the way President George W. Bush named the world's largest marine monument northwest of Hawaii in 2006. Marine sanctuaries will help preserve the ocean as well as the organisms which live within it who play important parts in our ecosystem.

Finally, a better information system could be built by the federal government. Currently, 49% of Americans agree that global warming is real and is due to human activities based on a CNN poll. If the government were to become more involved and show serious concern in sustainability, our nation would follow suit and begin to realize the same. This information would involve compiling observations related to climate change from around the world using clear scientific and emotional data. Additionally, this information would demonstrate how weather data has been influenced by broader shifts in planets overall climate change. It's no secret that the world still needs some more convincing on climate change and by increasing the amount of information put out there by the government, a heightened sense of urgency would be achieved and the realization of its presence in every other national issue would be understood.

By following these five actions, the US government could have a larger impact on the advancement of sustainability. There needs to be a congruent effort between what the voters and the electors on what the priorities of our country and world should be.

9) Identify five actions college students should take to advance sustainability. Include concrete examples to illustrate your ideas.

One of the last concerns for college students is whether they are practicing sustainable habits or not. In addition to the lack of caring, they also have similar mentalities as all other people where their contributions to pollution will not make a difference. They also view themselves as unable to make any real type of change as they are not responsible for feeding themselves or providing their own living conditions at this point. That is untrue, there are many actions students can take in order to advance sustainability five of which include becoming educated, wasting less in dining halls, recycling, walking or biking to class, and reusing notebooks.

One action which college students can participate in to further advance sustainability would be to make certain sustainability classes a core requirement for undergraduate studies. So many individuals are uneducated when it comes to sustainable practices. I believe that it would be extremely beneficial to expose all students to education on the subject. College is a time where most students are living away from their parents for the very first time, it is an opportunity to learn how to live and function as an individual a prime moment to integrate sustainability into their life habits. Young college students if required to take classes on sustainability opens up a new level of education. At RPI for example students come into the school of Architect, Engineering, Biological... majors and are often closed off to subjects which do not pertain to their main interest of study. I argue however that the topic of sustainability is one which can have a huge impact not only on future careers but how we can create a global population which thinks and acts smarter when it comes to how we treat our planet. If Sustainability is expressed earlier to students they will be able to apply it to how they live in their dorms or houses, how they use materials in class. Sustainability could even begin to be introduced to different majors and begin to integrate itself and advance old curriculums. I know for architecture we have only had two sustainability classes which were not integrated into our core design studios, for a subject such as architecture where sustainability is so important shouldn't it be a part of almost every class?

Another location where sustainability can be further applied to a college campus would be the dining halls. Is it really sustainable to have so much food available throughout the day? At the dining halls today kids pile on plate after plate of food, wasting both food, the energy it took to produce the food, and the materials and energy to wash the plates. Dining halls should limit the amount of plates you can use at a given setting, limit the amount of food you do not finish or waste, and also limit the amount of napkins and paper products available to the students so that the dining hall experience can become a better balance between fulfillment and sustainability.

Recycling is an easy way to help promote sustainability. At RPI, the school is successful in always having a recycling bin next to a trash can. There can always be more ways and opportunities to recycle though. On college campuses a change that could be implemented would be the increase in recycling bins as well as labels which indicate what is actually recyclable. I feel that many students revert to throwing trash in the regular pale because they are unsure of whether it is actually recyclable. If there

was a sign or branding that indicated what certain bins will take people would be more confident in choosing the recycled bin when they have waste.

Notebooks and books are another issue on college campuses which could be modified. Students taking eight classes usually go to the campus bookstore at the beginning of the year and purchase eight notebooks and do not use all of paper in them. As we move further into the digital age there is less and less need for notebooks. Students should learn to reuse their notebooks when possible. Additionally, renting textbooks may be a better way of reusing books rather than buying completely new ones.

Lastly transportation is a large factor in sustainability. There should be a no private gas based vehicle transportation to and from campus for a specified radius. Students in the winter will sometimes drive fifty yards to park closer to campus to avoid the cold. They should be forced to find alternate routes in order to reduce the amount of carbon emissions from the cars, and counter to that, campuses should be forced to find sustainable solution to encourage walking and biking. Services like enclosed tunnels or walkways where people can transport to campus somewhat comfortably despite weather obstructions.

These are five simple actions that every student can partake in in order to advance sustainability positively. The earlier sustainable habits are learned and performed the better off our environment will be.

10) Explain the pros and cons of the expansion of the use of natural gas globally. Make sure you include climate change and hydro fracking in your answer.

Natural Gas has become a very valuable energy source, as well as a global asset in the economy. It is widely used in most aspects of life one of which is primarily in the industry. 27 percent of the total gas consumption is consumed in industry as it produces a large variety of products such as plastics, paints, ammonia for fertilizers, etc. It is also responsible for 21 percent of the total amount of natural gas consumed in a residential setting. This resource is primarily used for powering home appliances as well as electricity. In the United States, 30% of natural gas consumed is used to produce electricity. And finally, natural gas is used to fuel vehicles as it is cleaner and cheaper than gasoline or diesel. While natural gas is widely used and there is still more to learn about it as far as processing, there are many positive and negative attributes that need to be understood when deliberating about the use of natural gas.

There are many positives related to natural gas, one of which includes the way it is extracted from the ground. While it is still a fossil fuel and involves drilling, the technologies we have to perform hydro fracking is the most efficient way to extract natural gas. There is so much natural gas abundant in the U.S. that it allows our economy to flourish as well as makes it much cheaper because of its ease of access. Natural gas is the cleanest burning fossil fuel as well as one of the cheapest forms of this type of energy. It also benefits the economy in that many natural gas appliances are much cheaper in comparison to electrical ones. This is somewhat a way of cutting out the middle man as a portion of natural gas is used to produce electricity, so either way, an appliance is most likely being powered by natural gas. The byproduct of natural gas is emitted in a gaseous form, therefore it does not pollute the

ground or water. Additionally, in comparison to coal and oil, natural gas emits far less carbon dioxide into the atmosphere. In addition to its ease in availability, as it can be found almost everywhere worldwide, it has a wide variety of uses. Domestically, it can be used towards many household functions such as cooking, heating, drying, and the generation of electric power.

There are also many disadvantages when it comes to the use of natural gas, the main one being that it is still a fossil fuel. So why much of its resources are untapped in comparison to coal and oil, it still has the potential to become in the same state as the resources farther in the future. Although hydro fracking has many positives in the way it is a least invasive as possible, it is still potentially harmful to ecosystems in which it is implemented. The process of hydro fracking releases a lot of methane gas into the atmosphere which is one of the leaders in greenhouse gases. Additionally, there is a constant potential of water contamination through this process as well. Because this process is not as well known, there are limited laws regulating how it can perform. This allows hydro fracking companies to take advantage of smaller communities which do not have the knowledge or resources to defend themselves. Companies are attempting to begin the hydro fracking process in many locations before more and more limitations are put on it. Additionally, natural gas is a very flammable and toxic gas. Gas leaks are extremely dangerous which can cause fires and explosions. It is also very toxic to inhale making it very detrimental to the public health as it is so widely used in everyday life. One of the main risks with natural gas is that it is odorless by nature. Environmentally, when natural gas burns it produces many carbon compounds which are released into the atmosphere contributing to the greenhouse effect and thus climate change. Natural gas is a finite source of energy. While it is one of the cleaner fossil fuels it is still a fossil fuel therefore only slightly less unsustainable than other fossil fuels.

In conclusion there are many positive and negatives which are attributed to the use of natural gas in our society. While it is very abundant and a much cleaner form of fossil fuel, it is still very unsustainable as there is only a finite amount available to us. The use of natural gas can really only be viewed as short term energy source as we continue to spend our money and time on the priority of researching renewable energy sources in the hopes of phasing out fossil fuels.

12) What attitudes and cultural constructs in the US do environmental educators need to work against? Briefly describe at least one activity for k-12 students that would work against these attitudes and cultural constructs. Reference at least two films.

One of the most difficult things about fighting sustainability in our society now is that there are still a large amount of people who do not believe in it. This is because when they were children there was no real knowledge that sustainability was actually a problem to our world. Children develop their basic values, attitudes, skills, behaviors and habits in their early childhood. This can be seen with the abundance of racial stereotype examples often shown. Children are shaped to believe in things even when they are not actually being taught. There are several attitudes which our society has that are detrimental towards a child's outlook on sustainability.

The first attitude that causes many of the problems reflecting sustainability, is the attitude that one person is not going to make a change in the large scheme of climate change. While this might be

true, because everyone seems to have this attitude towards sustainability, a huge detriment to the environment is produced because now everyone is contributing to the commons. This might at first seem like too large of an issue to be dumped onto young children as well as very depressing, but there are many possible ways of introducing the topic in a constructive way that will be found interesting to children. This would involve portraying the child as someone who actually has responsibilities to our society – a skill they are already being taught. It should be enforced that his or her contribution is very important for the future and is not invisible.

A second attitude which many people have is that the amount of resources are so large that we couldn't possibly put a dent into them, and that they were put on this earth for us to use. This can be shown when BP produced the oil spill. One of their excuses was that the ocean was so vast that even the amount of oil spilt into was minuscule. This wastefulness in resources is one main problem with our society and if children are taught early that we need to coexist with our environment rather than exploit it, the environment would be in a much better place. Activities which would force children to engage in actions which favor the environment encouraging equality and fairness. If young children are encouraged to question over-consumption at a young age they might not be as susceptible to the brainwashing our advertisements are attempting on them. As stated in the film *The Corporation*, advertisements are being catered to their viewers – this includes children. Psychologists are hired in order to assist in brainwashing children into begging their parents to buy their products. This attitude should altered to one which reflects the need to only consumer what is necessary as well as reduce waste.

A third attitude which is mostly due to the lack of knowledge to even adults, is that all of the food in a grocery store comes from the same place and organic food is just more expensive. From watching the movie *Fresh*, we know this to be false, as organic food is produced by animals which were raised in positive living conditions. These animals and crops did not use any forms of pesticides, antibiotics, or other manmade chemicals in order to help their growth. Currently, people are only looking at the price as they cannot see the living conditions these animals were brought up in. Additionally, while the products may look the same, they differ greatly in nutrients, minerals, and vitamins. Organic food is priced higher because you are in fact paying for a higher quality of food. It is this lack of knowledge which allows for industrial agriculture to thrive. It can be stopped at a very young age by actually showing children what is happening in the real world rather than protecting them. One action that can be taken at all years is annual field trips to different farms. While this could include positive farms showing healthy animals which are still used as a source of sustenance, it should also include the harsh reality of industrial agriculture. These visions, even to adults, would be life changing. But by contrasting the two types of farms it shows that vegetarianism doesn't necessarily need to be the answer. Organic foods coming from sustainable farms can be the answer. Humans are omnivores and just because of the exploitation of these animals that has been so widely used now, doesn't mean that we need to stop eating meat. We just need to be conscious of where our food is coming from.

Because children are so susceptible to opinions and values at such young ages, adding sustainability into the curriculum can really because a positive resource in views on the environment. Children are so easily shaped at these early stages and thus this should be used in a positive form to truly educate children on real threats to the world, rather than be exploited further by companies trying to sell products.